

Atty's 22675

Pat. App. 10/661,354

CLAIM AMENDMENTS

Claims 1 to 23 (canceled).

1 24.. (previously presented) An operating method for a
2 packaging machine of the "sleeve" type, which wraps sheets of
3 packaging material around objects, in which the said machine
4 comprises:

5 a first object conveyor for feeding the objects
6 longitudinally in a spaced sequence;

7 a second object conveyor, located downstream of and at a
8 short distance from said first object conveyor thus forming a first
9 opening between said first and said second object conveyors for
10 receiving objects arriving from said first object conveyor and for
11 transporting said objects along a wrapping plane which has an entry
12 end and an exit end;

13 a third object conveyor located downstream of and at a
14 short distance from said second object conveyor and forming
15 therewith a second opening between the second and said third object
16 conveyors for receiving the objects arriving from said second
17 object conveyor;

Atty's 22675

Pat. App. 10/561,354

18 a sheet wrapper, located in proximity to said second
19 object conveyor and comprising at least one suspended wrapping bar
20 which is oriented transversely with respect to a direction of
21 advance of the objects and adapted to move through said first and
22 said second openings along an orbital path which circumscribes the
23 top of the said second object conveyor, and can transport said
24 sheets;

25 a sheet conveyor having a conveyor belt, positioned
26 underneath and aligned with said first opening, for feeding the
27 sheets into said first opening (A1); and

28 a synchronizer for synchronizing said conveyor and said
29 sheet wrapper with each other, said method comprising the steps of
30 moving on said conveyor belt and toward said first
31 opening a sheet having a configuration that comprises at least a
32 portion of accumulation of packaging material in which the packing
33 material is accumulated along a segment of said conveyor belt and
34 with at least one crest; and

35 a synchronizer for synchronizing said sheet wrapper with
36 each other, said synchronization causing an accumulated portion to
37 form on said conveyor belt, said accumulated portion of material
38 being of the undulating type with at least two crests;

Atty's 22675

Pat. App. 10/661,354

39 moving on said conveyor belt and toward said first
40 opening at least a portion of accumulation of packaging material;
41 and

42 moving the wrapping bar upward through said first opening
43 when said portion of accumulation of packaging material is disposed
44 in proximity of said first opening.

1 25. (previously presented) The operating method defined
2 in claim 24 wherein the sheet disposed on said conveyor belt has a
3 configuration comprising a first portion in which the packaging
4 material is spread out on said conveyor belt and wherein said first
5 portion is positioned downstream with respect to said portion of
6 accumulation.

1 26. (previously presented) The operating method defined
2 in claim 25, further comprising the step of:
3 forming on said conveyor belt said portion of
4 accumulation in which the packaging material is disposed
5 accumulated on and along a segment of said conveyor belt.

1 27. (previously presented) The operating method defined

Atty's 22675

Pat. App. 10/661,354

2 in claim 26 wherein the sheet disposed on said conveyor belt has a
3 configuration comprising a further third portion in which the
4 packaging material is spread out on said conveyor belt and wherein
5 said third portion is positioned upstream with respect to said
6 portion of accumulation.

1 28. (previously presented) The operating method defined
2 in claim 27 wherein the said configuration of the sheet having an
3 accumulated portion of material is of the undulating type with a
4 single crest.

5 Claim 29 (cancelled).

6 30. (previously presented) The operating method defined
7 in claim 27 wherein the said configuration of the sheet having an
8 accumulated portion of material is of the gathered type.

1 31. (previously presented) The operating method defined
2 in claim 24 wherein a phase relationship is provided between the
3 said sheet conveyor and said sheet wrapper in which, when the
4 initial part of the said accumulated portion of material reaches

Atty's 22675

Pat. App. 10/661,354

5 the proximity of the said first opening, the wrapping bar passes
6 through the said first aperture to initiate a phase of conveying
7 the sheet.

1 32. (previously presented) The operating method defined
2 in claim 24 wherein the first, second and third conveyors are
3 driven at constant speed in order to transport the objects with a
4 constant motion from the entry to the exit end, and wherein the
5 sheet wrapper and/or the sheet conveyor are driven at variable
6 speed in order to produce phase relationships for the execution of
7 the wrapping operations.

1 33. (previously presented) The operating method defined
2 in claim 24, in which the objects are advanced in individual
3 succession from an upstream side toward downstream side and in
4 which for each object to be packaged the following steps are
5 provided:

6 moving on said conveyor belt (51) and toward said first
7 opening a sheet having a configuration that comprises at least a
8 portion of accumulation of packaging material in which the packing
9 material is accumulated along a segment of said conveyor belt;

Atty's 22675

Pat. App. 10/661,354

10 supplying a front portion of the sheet towards an
11 entry end of the said second object conveyor in phase with the
12 arrival of the object on the object second conveyor, the said front
13 portion of the sheet being disposed between the object and a
14 transport surface of the second object conveyor;

15 moving the wrapping bar upward through said first
16 opening, when the rear end of the object has passed beyond the said
17 first opening and when the portion of accumulation of packaging
18 material is in proximity of said first opening;

19 moving the wrapping bar along the orbital path above the
20 object and in the downstream direction drawing said accumulated
21 portion supplied toward said first aperture by said conveyor belt;

22 moving the wrapping bar beyond the object and then
23 downwards through said second opening before the object reaches the
24 second aperture itself, dangling a terminal part of the piece of
25 the sheet between the said second conveyor and the said third
26 conveyor means; and

27 moving the object from the second conveyor means to the
28 third conveyor and placing the terminal part of the sheet beneath
29 the object.

Atty's 22675

Pat. App. 10/661,354

1 34. (previously presented) The operating method defined
2 in claim 24 wherein said machine additionally comprises a sheet
3 feeder, located upstream of said sheet conveyor, for feeding sheets
4 of packaging material towards and onto the conveyor belt of the
5 sheet conveyor, wherein the accumulated portion of material
6 provided for the sheet is formed on the conveyor belt (51) by using
7 for the said sheet feeder feeding speed for the sheets greater than
8 a conveying speed of the conveyor belt of the sheet conveyor means.

1 35. (Previously presented) The operating method defined
2 in claim 34 wherein the configuration of the sheet having an
3 accumulated portion of material is of the undulating type with a
4 single crest and is produced by means of the following phases:

5 a first phase in which the speed of feeding the sheet
6 imparted by the sheet feeder is equal to a transport speed of the
7 belt imparted by the sheet conveyor means, thus producing on the
8 conveyor belt a first portion which is spread out;

9 a second phase in which a transport motion of the
10 conveyor belt of the sheet conveyor is temporarily stopped, while a
11 motion for feeding the sheet of the sheet feeder is maintained,

Atty's 22675

Pat. App. 10/661,354

12 thus producing a second, undulating accumulated portion of
13 material, and

14 a third phase in which the speed of feeding the sheet
15 imparted by the sheet feeder is equal to the transport speed of the
16 belt imparted by the sheet conveyor means, thus producing on the
17 conveyor belt a third portion which is spread out.

1 36. (Previously presented) The operating method defined
2 in claim 35 wherein the configuration of the sheet having an
3 accumulated portion of material of the undulating type with at
4 least two crests is produced by reflecting the second and third
5 phases one or more times.

1 37. (Previously presented) The operating method defined
2 in claim 34 wherein the configuration of the sheet having an
3 accumulated portion of material of the undulating type with at
4 least one crest is produced by means of the following phases:

5 a first phase in which the speed of feeding the sheet
6 imparted by the sheet feeder is equal to a transport speed of the
7 belt imparted by the sheet conveyor, thus producing on the conveyor
8 belt a first portion which is spread out;

Atty's 22675

Pat. App. 10/661,354

9 a second phase in which the speed of feeding the sheet
10 imparted by the sheet feeder is greater than the transport speed of
11 the belt imparted by the sheet conveyor, thus producing on the
12 conveyor belt a second, accumulated portion of material which is
13 undulating with a crest, and

14 a third phase in which the speed of feeding the sheet
15 imparted by the sheet feeder is equal to the transport speed of the
16 belt imparted by the sheet conveyor, thus producing on the
17 conveyor belt a third portion which is spread out.

1 38. (previously presented) The operating method defined
2 in claim 37 wherein the configuration of the sheet having an
3 accumulated portion of material of the undulating type with two or
4 more crests is produced by repeating the second and third phases.

1 39. (previously presented) The operating method defined
2 in claim 34 wherein the configuration of the sheet having an
3 accumulated portion of material of the gathered type is produced by
4 means of the following phases:

5 a first phase in which the speed of feeding the sheet
6 imparted by the sheet feeder is equal to the transport speed of the

Atty's 22675

Pat. App. 10/661,354

, belt imparted by the sheet conveyor, thus producing on the conveyor
8 belt a first portion which is spread out; and

9 a second phase in which the speed of feeding the sheet
10 imparted by the sheet feeder is greater than the transport speed of
11 the belt imparted by the sheet conveyor, thus producing on the
12 conveyor belt (51) a second, accumulated portion of material which
13 is gathered.

1 40. (previously presented) The operating method defined
2 in claim 34 wherein the said sheet feeder is provided with a cutter
3 and the said sheet feeder initially feeds towards the said conveyor
4 belt the front portion of a continuous strip after which the said
5 continuous strip is cut by said cutter in order to produce the
6 sheet.

1 41. (previously presented) The operating method defined
2 in claim 34 wherein the sheet feeder is driven with a constant
3 motion and the sheet conveyor is driven with a variable motion.

1 42. (Previously presented) The operating method defined
2 in claim 34 wherein an angle of incidence between a plane in which

Atty's 22675

Pat. App. 10/661,354

3 the sheets are fed and a plane in which the sheets are conveyed is
4 varied in order to obtain the desired configuration of the
5 accumulated portion of the sheet.

1 43. (Currently amended) A packaging machine comprising:
2 a first object conveyor for feeding the objects
3 longitudinally in a spaced sequence;
4 a second object conveyor, located downstream of and at a
5 short distance from said first object conveyor thus forming a first
6 opening between said first and said second object conveyors for
7 receiving objects arriving from said first object conveyor and for
8 transporting said objects along a wrapping plane which has an entry
9 end and an exit end;
10 a third object conveyor located downstream of and at a
11 short distance from said second object conveyor and forming
12 therewith a second opening between the second and said third object
13 conveyors for receiving the objects arriving from said second
14 object conveyor;
15 a sheet wrapper, located in proximity to said second
16 object conveyor and comprising at least one suspended wrapping bar

Atty's 22675

Pat. App. 10/661,354

18 which is oriented transversely with respect to a direction of
19 advance of the objects and adapted to move through said first and
20 said second openings along an orbital path which circumscribes the
21 top of the said second object conveyor, and can transport said
22 sheets;

23 a sheet conveyor having a conveyor belt, positioned
24 underneath and aligned with said first opening, for feeding the
25 sheets into said first opening (A1); and

26 a synchronizer for synchronizing said conveyor and said
27 sheet wrapper with each other,

28 said synchronization causing an accumulated portion to
29 form on said conveyor belt, said accumulated portion of material
30 being of the undulating type with at least two crests;

31 said first, second and third object conveyors being
32 driven by a first servo motor connected to said synchronizing;

33 said sheet wrapper being driven by a second servo motor
34 connected to the said synchronizer;

35 said sheet conveyor being driven by a third servo motor
36 connected to said synchronizer and transporting towards the said
37 first opening said sheet of wrapping material having an accumulated
38 portion of material; and

Atty's 22675

Pat. App. 10/661,354

39 said synchronizer comprising a programmable control unit
40 which controls the said first, second and third servo motors in
41 such a way that the said wrapping bar picks up the said accumulated
42 portion of material in the proximity of the said first opening and
43 then conveys the sheet around the object.

1 44. (Previously presented) The packaging machine defined
2 in claim 43 wherein said conveyor belt of the sheet conveyor is of
3 the suction type.

1 45. (Previously presented) The packaging machine defined
2 in claim 44 wherein said machine additionally comprises a sheet
3 feeder, located upstream of said sheet conveyor, for feeding sheets
4 of packaging material towards and on the conveyor belt of the sheet
5 conveyor, said sheet feeder being driven by a fourth servo motor
6 connected to said synchronizer; said programmable control unit
7 controlling the fourth servo motor, and in order to produce the
8 accumulated portion of material, said programmable control unit
9 controls the speed of the said third servo motor and of the said
10 fourth servo motor in such a way that the transport speed of the
11 conveyor belt of the sheet conveyor is lower than the sheet feeding

Atty's 22675

Pat. App. 10/661,354

12 speed of the sheet feeder.

1 46. (Previously presented) The packaging machine
2 according to claim 43 wherein said sheet feeder additionally
3 comprises a cutter for cutting a continuous strip of packaging
4 material in order to produce the sheets, said cutter being driven
5 by a servo control unit and controlled by the synchronizer.

1 47. (Previously presented) The packaging machine
2 according to claim 43 wherein said sheet feeder is oscillatable
3 angularly about an axis lying parallel to a plane of transport of
4 the sheets formed by the conveyor belt, to make it possible to
5 adjust an angle of incidence between a plane in which the sheets
6 are fed and a plane in which the sheets are conveyed.

1 48. (Previously presented) The packaging machine
2 according to claim 43 wherein an outer casing is provided to
3 enclose operating elements said sheet feeder in order to avoid
4 contact between the material forming the accumulated portion and
5 the said operating elements.